

so easily, other so-called elements, and especially those which, like bromine and iodine, are closely related to chlorine, will not long resist the attacks to which they will now be subjected; indeed, the Messrs. Mayer already state in their paper that the behaviour of iodine is similar to that of chlorine.

In concluding this notice I cannot refrain from stating that to my knowledge Mr. Lockyer has for several months past been engaged in the spectroscopic investigation of the non-metals, and that he has repeatedly assured me that the views he has already published with regard to the metals are equally applicable to the non-metals. He has shown me, moreover, that with the spark at a particular tension the *red line of oxygen* is one of the most prominent lines in the spectrum of chlorine, the freedom from which of admixed air and moisture is attested by the absence of the characteristic nitrogen and hydrogen lines. Mr. Lockyer regards this as confirmatory of the Meyers' discovery.

HENRY E. ARMSTRONG

SCIENCE IN THE ARGENTINE REPUBLIC

Description physique de la République Argentine ; d'après des Observations personnelles et étrangères. Par le Dr. H. Burmeister, Directeur du Museo Público de Buenos-Ayres. Tome Cinquième : Lépidoptères, 1^{re} Partie, contenant les Diurnes, Crépusculaires et Bombycoïdes. (Buenos-Ayres, Paris, et Halle, 1878, 8vo.; Atlas de xxiv.¹ Planches, 1879, 4to.)

IN commencing a notice of this work it is impossible to avoid an expression of admiration for the persistent energy displayed by its septuagenarian author. Half a century has elapsed since his "inaugural dissertation" (on an entomological subject) was read at Halle, and during this time a continuous flow of valuable works and articles has appeared from his pen, not only in the long period of his professorship at Halle but also since he became permanently located in Buenos Ayres. Now, at an age when most men who have attained it have lapsed into "the sere and yellow leaf," so far as laborious work is concerned, we find him undertaking a gigantic enterprise, of which entomology is only a portion. All those who have had occasion to consult his former works will heartily acquiesce in the hope that he may live to complete this.

Without doubt the most valuable features of the volume under consideration consist in the numerous direct observations by the author and his son, on the structure and life-histories of the insects treated upon, from living subjects, in contradistinction to what may be termed mere museum work. In one respect disappointment will be felt. It might have been expected that an author of such vast experience, and with such admirable opportunities, would have been explicit in expression of opinion on those important subjects of philosophical inquiry that now occupy the attention of all entomologists, and for which South America furnishes such notable materials.

On the question of mimicry he appears to be absolutely silent, contenting himself by occasional remarks on the fact of resemblances, but without comment. On the theory of evolution he is scarcely more explicit, and the only remarks that bear, even indirectly, on this subject

are those that appear in the "Avertissement" to the description of the plates, where he says:—

"I am unable to share the views of those specialists who augment the number of species indefinitely by slight variations; on the contrary, I am a partisan of the opinion, well founded on experience, that each species, although from a scientific point of view fixed and up to a certain point invariable, is forced to modify itself under different external influences of climate and food, and that these influences may, to a certain extent, alter some of the subordinate specific qualities. This faculty will be greater in proportion as the territory over which the species is spread may be more vast, and one will only find altogether invariable, those local species that have never quitted their place of origin. From this restricted point of view I am a partisan of the theory of the variability of species."

From this it will naturally be understood that our author is no advocate for the reckless creation of "species" now so alarmingly put in practice, to apparently little other purpose than the gratification of the vanity of those species-makers who wish to see their names attached to an endless list of synonyms. That the author is right in his reductions in the case of those species inhabiting the region immediately under his observation, possibly few only will dispute, and, above all, not those who know the exactitude of his critical powers in this respect; but other reductions concerning forms from the more northern parts of the South American Continent may be open to question, unless on the standpoint taken as to the value of the term "species."

The existence in the southern portion of the vast continent of South America of certain genera belonging to the nearctic fauna, has not escaped the author's notice. He alludes to the subject more than once, even in connection with the purely Argentine fauna, but without further comment.

The introductory anatomical portion is, as might have been expected, of the utmost value, and may be studied with advantage by students of Lepidoptera generally. Exception might probably be taken to too great importance being attached to the covering of scales as an attribute of the order. Instances (p. 1) might have been cited of the existence of "scales" in other orders, such as the well-known *Podura* and *Thysanura*, many *Curculionidae*, some *Trichoptera*, certain forms of *Psocidae*, &c., if not on the trunk itself, at any rate on the wings and other appendages.¹ An entire chapter is devoted to the structure of the scales, and the conclusion arrived at is that the well-known longitudinal striations exist only on the *upper* surface; if the writer mistake not, microscopists have arrived at the same conclusion from an examination of that favourite "test-object," the "*Podura*-scale."

As in all his works, the author shows himself a rigid advocate for "purity of nomenclature," and does not hesitate to adopt the spelling he considers the more correct. On the question of priority we read (p. 110): "The strict observance of priority of nomenclature appears to me an exaggeration of scientific law; I prefer names given by masters, such as Linné, Fabricius, Latreille, &c., to those of simply collectors, as Cramer, Drury Donovan, &c., following the axiom *au mérite la couronne*." Regarding these words from a sentimental point of view,

¹ The neuropterous genus, *Coniopteryx*, cited by the author (p. 1, footnote), has no scales; the covering is apparently a waxy secretion, soluble in ether.

² Of these only sixteen have as yet appeared.

few will object; but the possibility of applying them in the present state of science is, and probably will be, fiercely contested; and it may be justly urged that the descriptions in the works of the masters he alludes to, would not, in many cases, have been recognisable had the types not been in existence, or had it not been for the beautiful iconographic works of those authors whom he somewhat derogatively terms "simply collectors."

Turning to the purely systematic arrangement of the author, we find the *Lepidoptera* divided into *Rhopalocera* and *Heterocera*, or into *Diurna*, *Crepuscularia*, *Nocturna*, and *Microlepidoptera*. This is broad grouping, and we shall be curious to see, in a future volume, how it is proposed to get over the difficulties of the last-named. On some points of minor arrangement the author's views will be regarded as rank heresy by most entomologists of the present day; and the most notable of these are the positions assigned to those anomalous groups known as the *Castniadæ* and *Uraniadæ*, which are boldly united with the *Rhopalocera*, as groups 10 and 11 of that division, in opposition to the ideas of almost every one, and notably to those of Boisduval and Westwood (the latter author's recent memoir on the genus *Castnia*, and others, in the *Trans. Linn. Soc.*, ser. 2, Zoology, vol. i., 1877, is alluded to in the text attached to the plates). It is scarcely to be expected that the reasons given for this course will be found convincing to the majority; could it be so, the arrangement would be hailed with satisfaction by those numerous collectors who, confining themselves to "butterflies" only, are now debarred from adding to their stores some of the most beautiful insects that exist. The *Crepuscularia* are divided into *Sphingidæ* and *Sesiadæ*; the *Zyganidæ* are not represented in the author's faunistic region, but the *Glaucopidæ*, often associated with them, are transferred to the *Bombycoides*, and head that section. Many other points might be alluded to in which the author departs from common practice in systematic views, but it is only fair to him to state that, in all cases, he gives the fullest reasons for adopting the course, however insufficient they may appear to others; but this notice has already become too lengthy, and they must be left to the discretion of specialists, all of whom must of necessity possess the work. An inconsiderable number of new species are described.

The plates (only an uncoloured copy of the atlas is before us) are admirably executed, the drawings having been made by the author himself, and lithographed at Berlin, a course which has added greatly to their value, owing to the present impossibility of finding sufficiently skilled engravers in Buenos Ayres; at the same time it has naturally caused delay. The value attached to the beautiful representations of the transformations of many species, cannot be too highly estimated, and the explanatory text is very ample, containing also new matter, not appearing in the body of the work. R. McLACHLAN

MODERN METEOROLOGY

Modern Meteorology. A Series of Six Lectures Delivered under the Auspices of the Meteorological Society in 1878. (London: Edward Stanford, 1879.)

THE publication of "The Origin of Species" and the introduction of the spectroscope as an implement of research, have not wrought perhaps a greater revolu-

tion in the biological and physical sciences than has the invention of weather charts in the younger science of meteorology. One has only to look back a quarter of a century at the writings of meteorologists to see the radical change which has been brought about, not merely as regards the nomenclature of the science but even as regards the standpoint from which the whole phenomena of atmospheric movements are looked at. It was to diffuse more generally a knowledge of this change that the Council of the Meteorological Society arranged the delivery of these six lectures, which on the whole faithfully portray to the reader the present state of meteorology in its outstanding features.

From its important bearing on the future of meteorology in the British Islands, we note with great satisfaction the remark in the lecture on "Air Temperature" that the same pattern of thermometer box, viz., that known as the Stevenson, has been adopted at the stations of both the English and Scottish Meteorological Societies, to which may be added the stations of the Meteorological Office; and we heartily endorse the opinion expressed by the lecturer, Mr. J. Knox Laughton, that on such a vital subject as the observation of the temperature, absolute uniformity of pattern which is secured by the adoption of Stevenson's box, is better even than Utopian excellence.

The lecture by Mr. Strachan on the "Barometer and its Uses" is characterised by a full and exact knowledge of the instrument and its history, and a correct estimation of the present state of the problems relating to atmospheric pressure with which he has occasion to deal. His examination, for instance, of various theories which have been broached in explanation of the diurnal range of the barometer is acute and satisfactory, and from that examination he shows that a hypothesis yet remains to be framed which shall account for the diurnal oscillations of the barometer. The truth is, none who have yet attempted to account for the diurnal barometric oscillations—one of the widest spread and constant of terrestrial phenomena—have had before them sufficiently the facts of observation such as might indicate, with the requisite fulness of detail, the influence of geographical position on the problem which it is sought to solve.

Mr. Strachan throws out incidentally a valuable hint regarding the forecasts of our European weather which are wired from America. He says (p. 95):—

"It is worth while inquiring how our American friends manage this business. They are not very willing to show their hands, as the saying is. However, we may surmise how it is done. They have active agents who make extracts of the logs of all the steamers directly they arrive in New York, and by means of these extracts they can follow up all the storms which occur in our parallels. Thus it may often happen that information of storms is obtained by the *Herald* before they have had time to reach western Europe. The *Herald* at once flashes the news by telegraph. We get the telegram surely and speedily and the storm, if it does not vanish in the meantime, shortly afterward."

Whether this be the practice of the expert of the *New York Herald* or not, there cannot be a doubt that we have here an indication of the way in which substantial advance may be made in our system of weather forecasting, viz., by some central authority in America at once receiving by telegraph extracts from the logs of all vessels